

## The time-course of reference resolution in picture noun phrases: Evidence from eye-movements during reading

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Although binding theory (Chomsky 1981) originally predicted that reflexives and pronouns should be in complementary distribution ('John<sub>1</sub> injured himself<sub>1</sub>/him<sub>1</sub>'), complementarity breaks down in certain contexts (see e.g. Reuland 2011). One such context is the picture noun phrase (PNP; 'John<sub>1</sub> saw a picture of himself<sub>1</sub>/him<sub>1</sub>'), and the question of whether possessed PNPs (PPNPs; 'John's<sub>1</sub> picture of himself<sub>1</sub>/him<sub>1</sub>') should also be exempt from binding theory has been the subject of some debate (see Runner et al. 2006).

Psycholinguistic research has examined to what extent binding constraints are violable during sentence comprehension. While it has been argued that, for reflexives, binding theory applies early to guide the antecedent search for binding theory *accessible* antecedents ('John' in 'Steven knew John had injured himself') rather than *inaccessible* ones ('Steven') during comprehension (Sturt 2003), it has been claimed that inaccessible antecedents can have early effects on processing in (P)PNP contexts (Kaiser et al. 2009; Runner et al. 2006).

We examined reference resolution in (P)PNPs in four eye-tracking experiments. In each experiment, 28 native English speakers read 32 critical and 64 filler texts while their eye-movements were monitored. Experiments 1 and 2 examined reflexives in PNP and PPNP contexts (e.g. 1a/b). Critical texts contained one accessible and one inaccessible antecedent, and gender congruence (match vs. mismatch) between each antecedent and the reflexive was manipulated in a 2x2 design. Experiments 3 and 4 examined pronouns in PNP and PPNP contexts (e.g. 2a/b) using a similar manipulation, except that use of the temporarily ambiguous female pronoun was avoided (see Clifton et al. 1997).

Experiments 1 and 2 indicated the same relative time-course of antecedent effects for reflexives in both PNP and PPNP contexts. In both experiments, comparatively earlier reading time measures were longer when the accessible antecedent mismatched the stereotypical gender of the reflexive compared to when they matched, while effects of the inaccessible antecedent were in comparison delayed. For example, in (1b), stereotypical gender mismatches between the reflexive and accessible antecedent incurred longer reading times during the initial inspection of the reflexive and a spillover region, whereas effects of the inaccessible antecedent were only observed in second pass times of the spillover region. In Experiments 3 and 4 we observed reliable effects of the accessible antecedent only. For example, in both experiments, second pass times of the pronoun were reliably longer following a stereotypical gender mismatch between the pronoun and accessible antecedent in comparison to when they matched.

The results of Experiments 1 and 2 extend previous findings that binding theory applies early to guide reference resolution for reflexives (Sturt 2003). Although offline studies indicate comprehenders will accept 'inaccessible' antecedents as a potential antecedent for a reflexive inside (P)PNPs (Runner et al. 2003 Experiment 1) our results suggest that, contra Runner et al. (2006) who did not include gender mismatching conditions in their visual world experiments, accessible antecedents only are initially considered as potential antecedents for a reflexive during earlier stages of processing during reading. The antecedent search for pronouns in (P)PNP contexts appears to be similarly constrained.

- (1) Jonathan/Jennifer was walking through the military barracks. He/she heard...
  - (a) ... that the soldier had a picture of himself/herself in the middle of the mess hall.
  - (b) ... about the soldier's picture of himself/herself in the middle of the mess hall.
- (2) The medical staff had a meeting in the office. The surgeon/nurse recalled...
  - (a) ... that Jonathan/Jennifer noticed a portrait of him over at the back of the room.
  - (b) ... about Jonathan's/Jennifer's portrait of him over at the back of the room.

### References

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